

REMARKS

As recited in above-amended Claim 1, the invention is a glass substrate for a data storage medium, which consists essentially of: in terms of weight percent

SiO<sub>2</sub> 40 to 59 %,

Al<sub>2</sub>O<sub>3</sub> 5 to 20 %,

B<sub>2</sub>O<sub>3</sub> 0 to 8 %,

MgO 0 to 10 %,

CaO 0 to 12 %,

SrO 10.6 to 20 %,

BaO 0 to 2 %,

ZnO 0 to 4 %,

Li<sub>2</sub>O 0 to 2 %,

Na<sub>2</sub>O 0 to 10 %,

K<sub>2</sub>O 0 to 8 %,

TiO<sub>2</sub> 2 to 10 %, and

ZrO<sub>2</sub> 0 to 5 %,

wherein MgO + CaO + SrO + BaO is at least 15 %;

Al<sub>2</sub>O<sub>3</sub> + TiO<sub>2</sub> is at least 13 %;

TiO<sub>2</sub> + ZrO<sub>2</sub> is at least 2.3 %; and which has an average linear expansion coefficient of at least  $70 \times 10^{-7}/^{\circ}\text{C}$  within the range of 50 to 350° C, and wherein the glass has a glass transition temperature of at least 600°C.

An important aspect of the glass of the present invention is that the sum of the Al<sub>2</sub>O<sub>3</sub> and TiO<sub>2</sub> components is important from the viewpoint of its weather resistance characteristics, as demonstrated in the N<sub>L</sub> and N<sub>S</sub> data obtained for examples of glass formulations of Examples 1-8, 11 and 13-15 of the text. It is clear that all of these examples

exhibit favorable values of  $N_L$  and  $N_S$  which is consistent with the comments in the paragraph bridging pages 6 and 7 of the specification and on pages 10 and 11 of the text of the application concerning  $Al_2O_3$  and  $TiO_2$  and the sum of  $Al_2O_3$  and  $TiO_2$  in that the presence of these two oxides has a significant impact on the corrosion resistance of product glasses.

As can be ascertained by reviewing the examples in the specification herein that are within the terms of the presently-claimed invention,  $N_S$  is, in all cases, 5 or less. On the other hand, the comparative examples, i.e., Examples 9, 10, 12, and 16-21 all have an  $N_S$  greater than 5.

While it is true that the specification states that the presence of  $TiO_2$  is not essential, nevertheless, this does not belie the fact that the presence of  $TiO_2$  has an impact on the expansion coefficient, corrosion resistance and glass transition temperature of the product glass as stated.

The rejection of Claims 1, 3, 5, 6, 8, 9, 11, 13-15 and 25-27 under 35 U.S.C. § 103(a) as unpatentable over U.S. 5,854,152 (Kohli et al), is respectfully traversed. Kohli et al discloses a glass for display panels. However, as is clear from the comments at column 2 thereof,  $TiO_2$  is clearly an optional component of the glass, and whether used alone or in combination with other optional oxides, must not be present in an amount greater than 5%. Nothing is mentioned about the reason for use of  $TiO_2$  in the glass of the reference, and indeed, not one of the examples of Table I contains  $TiO_2$  as a component. Still further, there is absolutely no disclosure or suggestion in Kohli et al that  $Al_2O_3$  and  $TiO_2$  in some way cooperate to improve upon one or more properties of the glass. Further, Kohli et al does not show or suggest the subject matter of above-amended Claim 1, which sets forth specific combined quantities of  $Al_2O_3$  and  $TiO_2$  for the improvement of one or more properties of the glass.

Although the Examiner refers to the data of Example 10 of Table 1 of the text as not supportive of or as being inconsistent with Applicants' statements concerning the property inducing effects or significance of  $\text{Al}_2\text{O}_3$  and  $\text{TiO}_2$ , Applicants point out that of all 21 examples of glass compositions described in the Table, the composition of Example 10 contains the greatest quantity of alumina. In view of the fact that the text specifically indicates on page 6 that increasing amounts of  $\text{Al}_2\text{O}_3$  in the composition **improve** the corrosion resistance of the glass, as well as increase the glass transition temperature of the glass, it is therefore clear that the data of Example 10 of the specification are not inconsistent with Applicants' comments concerning the significance of the  $N_L$  and  $N_S$  data of Examples 1-8, 11 and 13-15 of the text because of the relatively high content of alumina in this glass.

For all the above reasons, it is respectfully requested that this rejection be withdrawn.

The rejection of Claim 1, 3, 5, 6, 8, 9, 11, 13-16 and 25-27 under 35 U.S.C. § 103(a) as unpatentable over U.S. 6,162,750 (Miwa et al), is respectfully traversed. Miwa et al discloses a glass for use in a plasma display panel or unit. Although  $\text{TiO}_2$  is briefly mentioned at column 2, lines 5-15 and column 4, lines 8-17 as an optional component of the glass composition, the stated reason for the presence of  $\text{TiO}_2$  is to protect the glass from UV rays. There is no disclosure or suggestion of the weather resistance characteristic of  $\text{TiO}_2$  as a component of the present composition, and there is certainly no disclosure or suggestion that the combination of  $\text{Al}_2\text{O}_3$  and  $\text{TiO}_2$  at a specific minimum value cooperates in achieving a glass composition that exhibits improved corrosion resistance. Moreover, of all the sample numbers listed in Table 1 of Miwa et al, only Sample 3 meets the presently-recited requirement that the amount of  $\text{Al}_2\text{O}_3 + \text{TiO}_2$  be at least 13% (in said Sample 3, the amount is 13%). However, the glass transition temperature therein is  $582^\circ\text{C}$ , which is lower than the presently-recited minimum of  $600^\circ\text{C}$ . As described in the specification herein, a glass having a minimum glass transition temperature of  $600^\circ\text{C}$  has an advantage that the recording density

can be easily increased. Miwa et al recognizes no nexus between the total amount of  $\text{Al}_2\text{O}_3$  and  $\text{TiO}_2$ , on the one hand, and minimum glass transition temperature on the other hand.

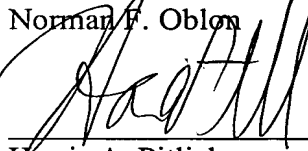
For all the above reasons, it is respectfully requested that this rejection be withdrawn.

All of the presently-pending claims in this application are now believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

Respectfully submitted,

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